

# ***Common Core, UbD, and Transdisciplinary Learning***



# Objective of today's session:

- Participants will
  - Have a better understanding of transdisciplinary learning
  - Apply the UbD planning process for transdisciplinary projects.
  - Understand the effectiveness of this process in planning for Common Core instruction.



# Transdisciplinary Learning

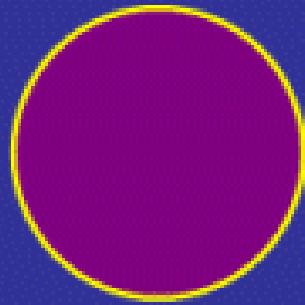
- What is transdisciplinary learning?



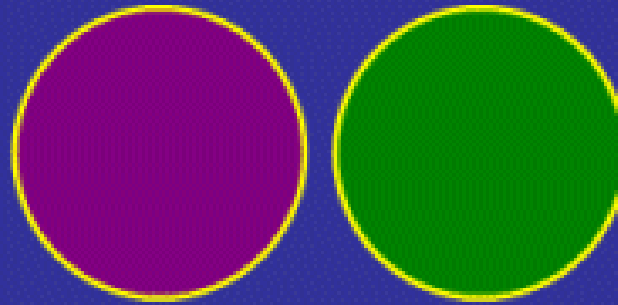
# Transdisciplinary Learning

- Most educators are familiar with multi- or interdisciplinary approach to curriculum. These approaches involve more than one subject area and focus on a common concepts/understandings or processes. The transdisciplinary unit of study is transcendent of the curriculum content and focuses on authentic learning, new perspectives, current issues within the context of multiple disciplines.

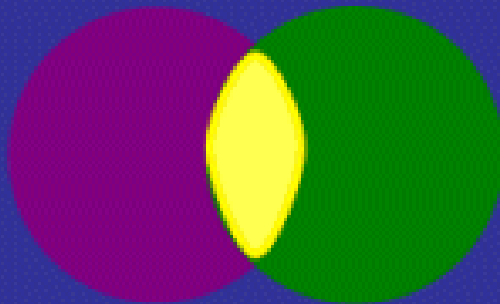




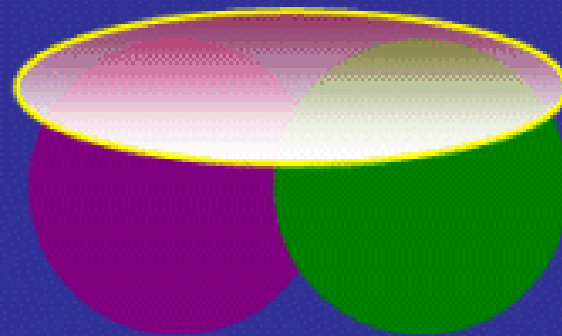
Disciplinary



Multidisciplinary



Interdisciplinary



Transdisciplinary



# Transdisciplinary Learning

- Learning to know - This is the capability of making connections, adapting to changes and knowing how to learn. Most notably, this refers to the inquiry-based approach to learning such as the scientific process or research and information fluency.
- Learning to do - transdisciplinary learning is framed in the idea of project-based learning or performance tasks that demonstrate the ability to apply knowledge in a creative manner.
- Learning to live together - the interconnectedness of the world makes this aspect even more urgent for a need to be able to collaborate on a local and global scale.
- Learning to be - the life-long journey of self-discovery must be part of the process of learning.

– Basarab Nicolescu in *The Transdisciplinary Evolution of Learning*





# Transdisciplinary: making the connections

- The idea of transdisciplinary literally means beyond all the disciplines but connected to all the disciplines by a unifying issue or topic of inquiry. Transdisciplinary learning is supported by curriculum frameworks popularly adopted to promote depth of understanding as well as adaptability to skills needed to succeed in our changing world. These include Understanding by Design, 21st Century Skills & Knowledge, ISTE 2007 standards, project- and problem-based learning. In addition, the most recent brain research supports that connections helps students understand complex concepts.



# Essential Questions

**Does integrated curriculum work?**

**Do transdisciplinary projects work?**

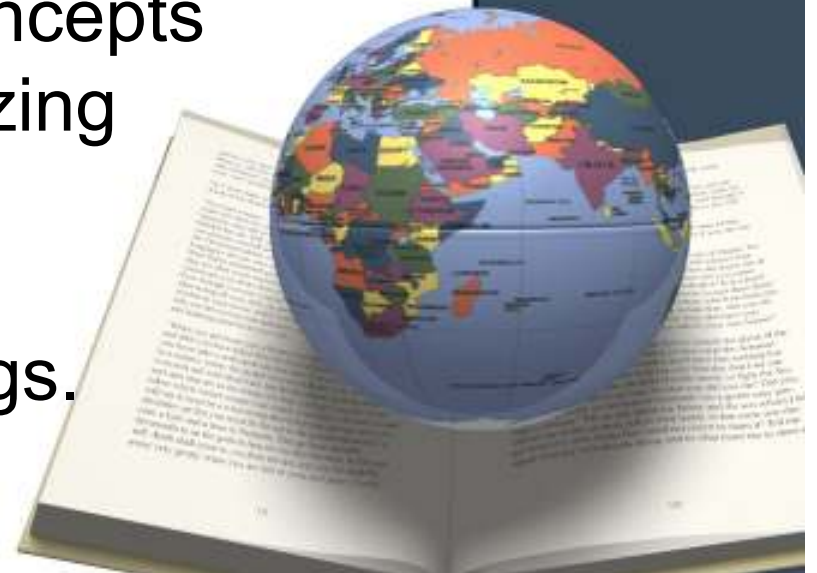






## Key Components:

- A combination of subjects
- An emphasis on projects
- Sources that go beyond textbooks
- Relationships among concepts
- Focused units as organizing principles
- Flexible schedules
- Flexible student groupings.



# Common Core Standards

- Why Common Core?
- Why are Transdisciplinary Learning and UbD keys to successful implementation of CCSS?



# What will students need to be successful in their world?

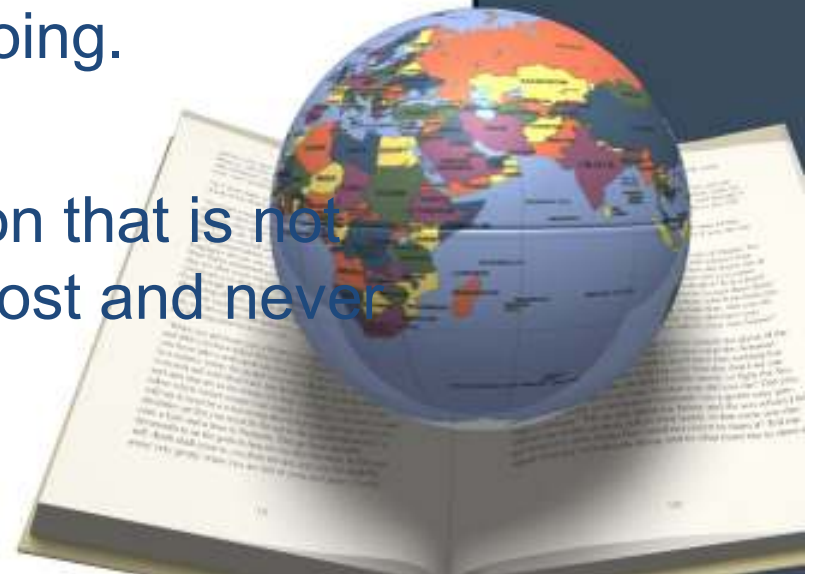
- A high capacity for abstract, conceptual thinking
- The ability to apply this thinking to real world problems
- The ability to function in an environment where communication skills are vital
- The ability to work easily and well with others to resolve conflict and to work well without close supervision.

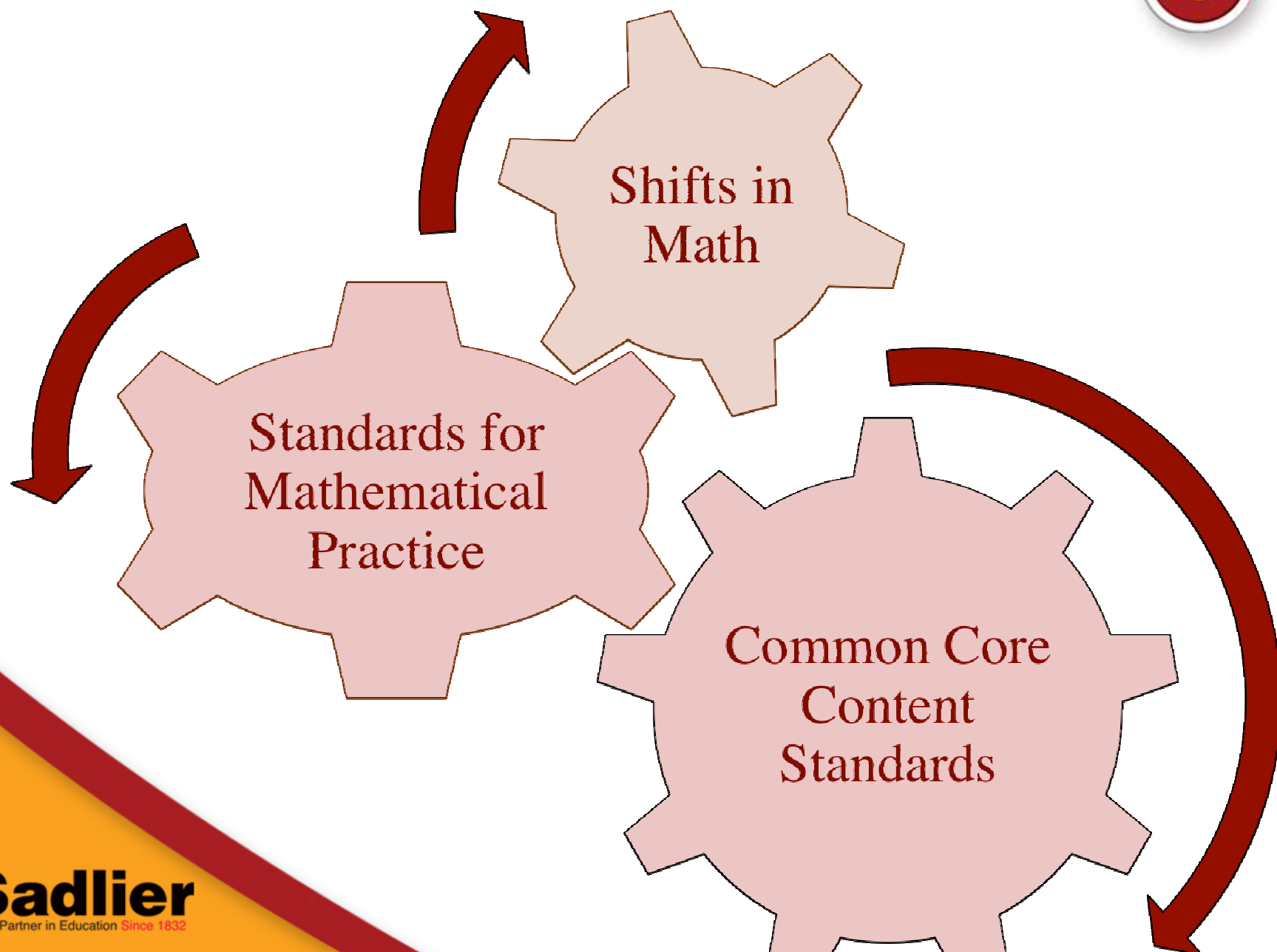
(Marshall and Tucker, 1992)



# Student-centered learning with real-world connections

- More is learned if the student perceives the content as relevant.
- More learning is retained if the learning is acquired through discovery or doing.
- Attention is selective. Information that is not selected for attention is forever lost and never learned.







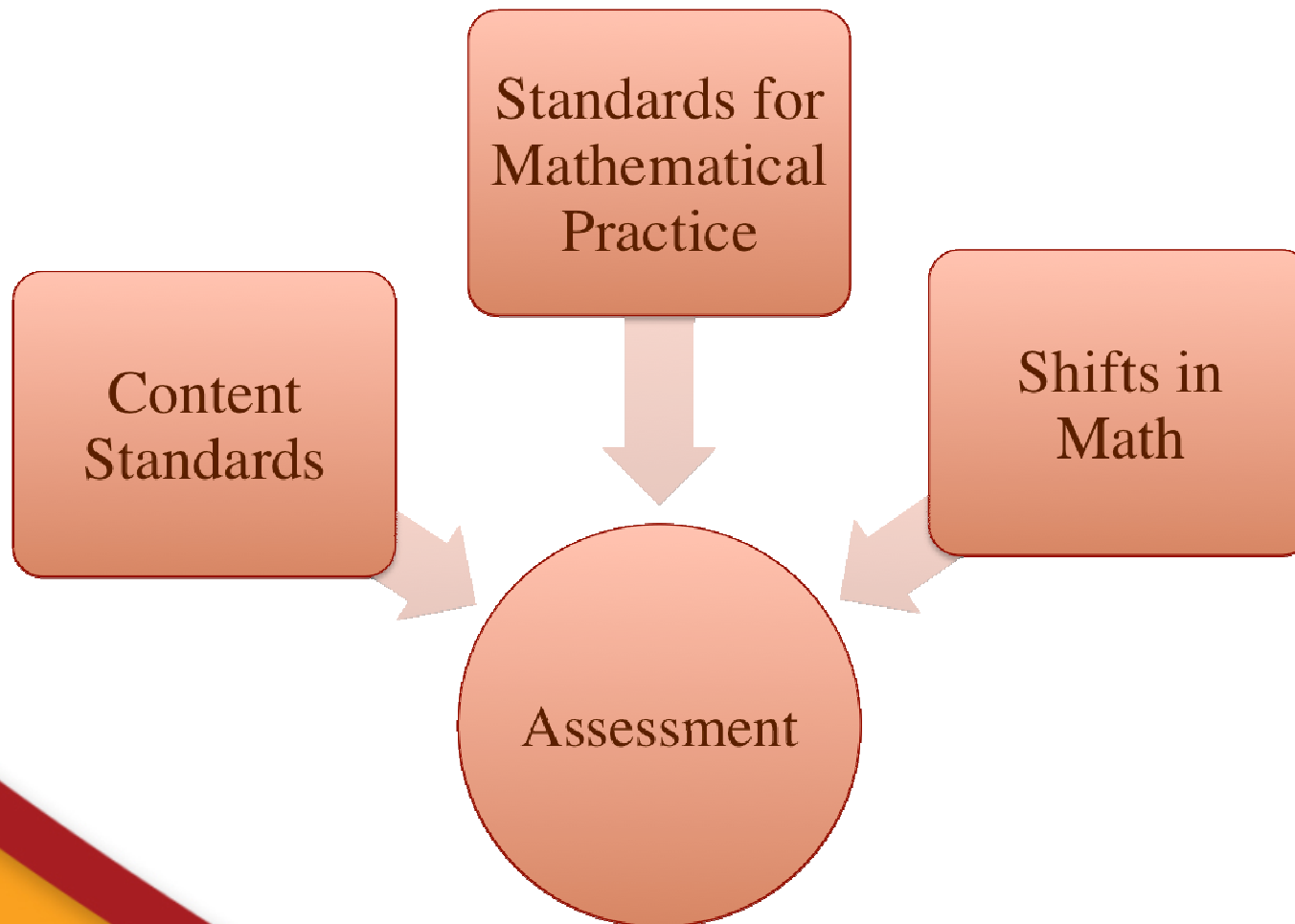
**Common  
Core  
Content  
Standards**

**NOW focus much more on:**

- the reasoning,
- the process,
- and the different ways to solve a problem.



# Common Core

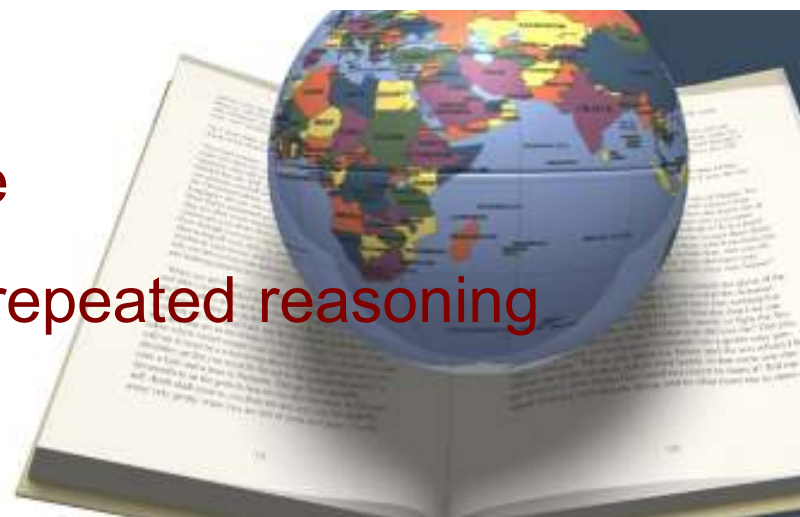






## The 8 Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning





# Grouping the Practice Standards

1. Make sense of problems and persevere in solving them  
6. Attend to precision

2. Reason abstractly and quantitatively

3. Construct viable arguments and critique the reasoning of others

4. Model with mathematics

5. Use appropriate tools strategically

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

- Reasoning & Explaining
- Modeling & Using Tools
- Seeing Structure & Generalizing



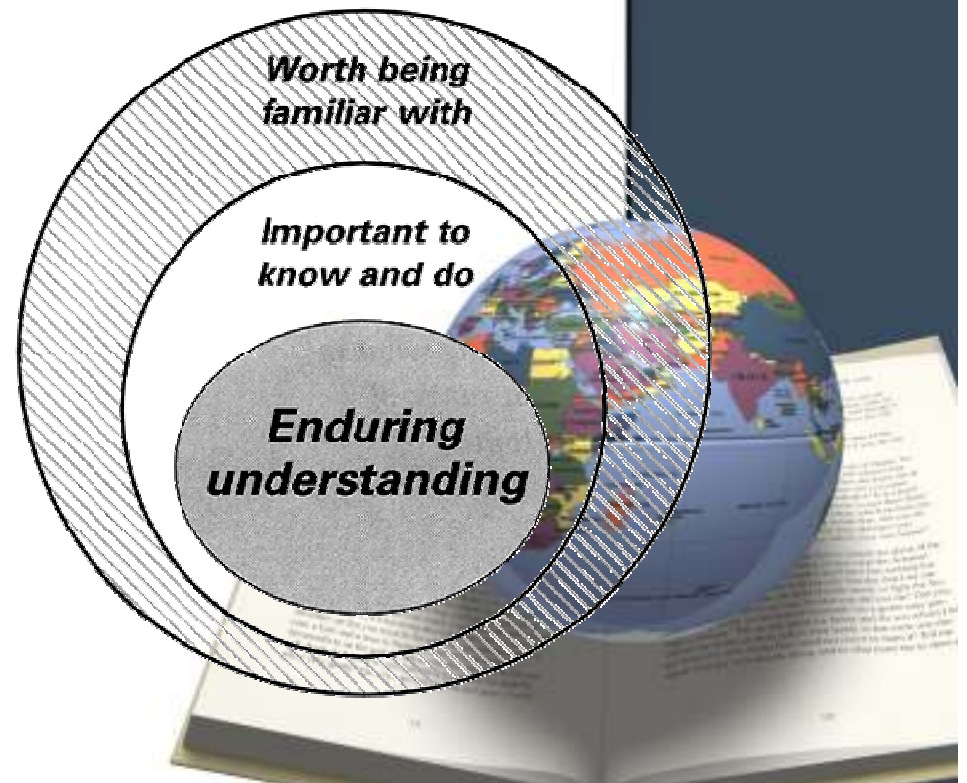


# UbD

## Understanding by Design

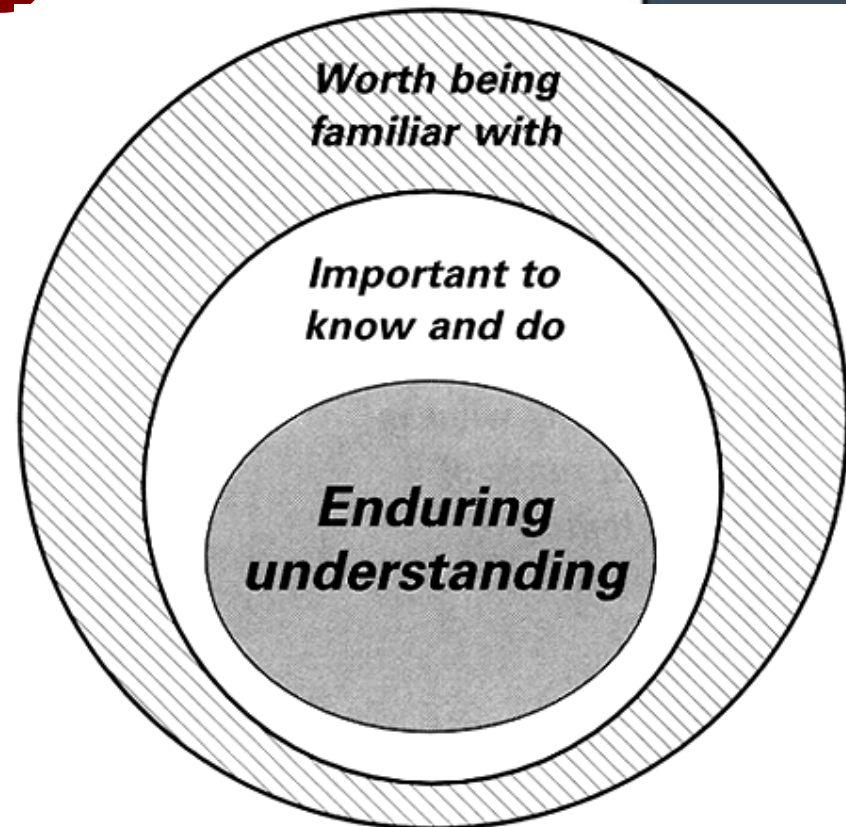
## Transdisciplinary Learning Uses the Understanding by Design Framework

- # The 'Big Ideas' of UbD



## Transdisciplinary Learning Uses the Understanding by Design Framework

- # The 'Big Ideas' of UbD



# **What is UbD?**

## **3 Stages of (“Backward”) Design**

**1. Identify desired results**

**2. Determine acceptable evidence**

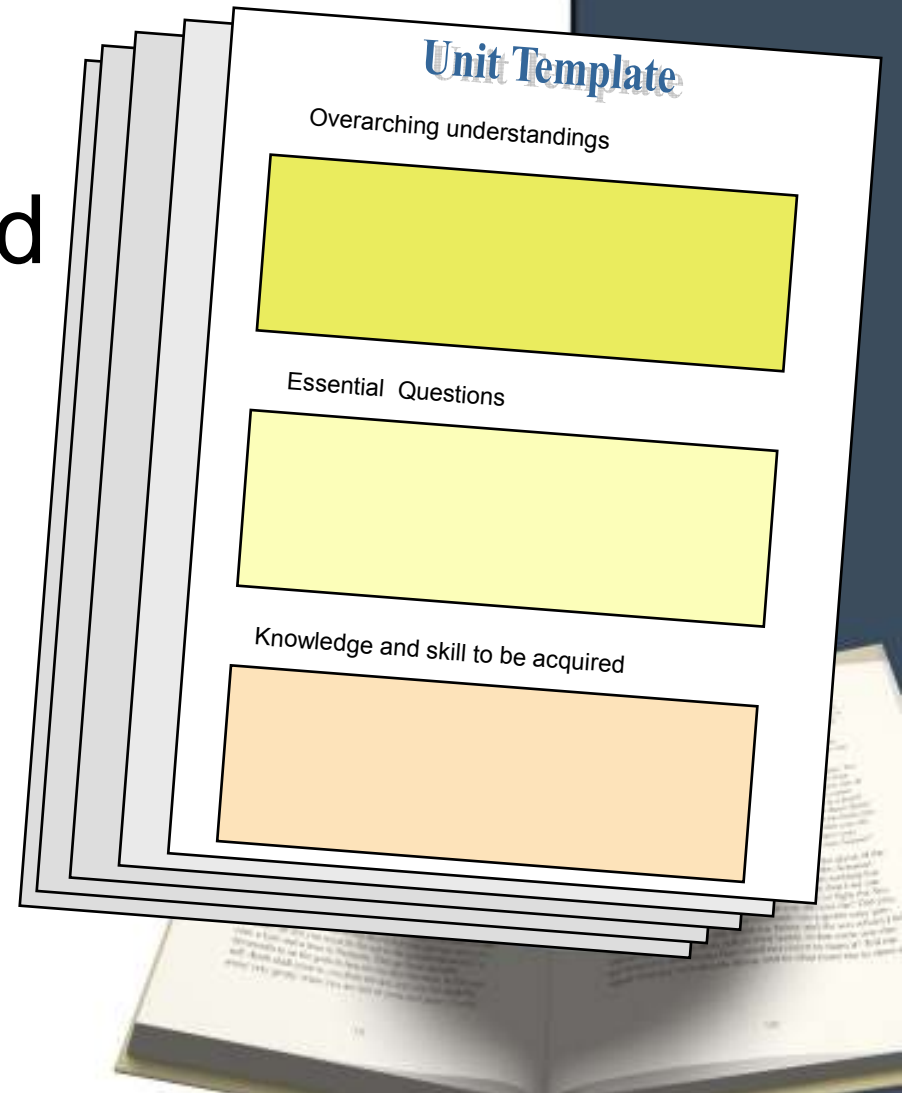
**3. Plan learning experiences  
& instruction**





## Understanding by Design Template

- The UbD template embodies the 3 stages of “Backward Design”
- Transdisciplinary Learning template mirrors this template.





# The “Big Ideas” of Each Stage:

**Stage 1:** Identify desired results  
*Unpack the content standards and ‘content’, focus on big ideas*

**Stage 2:** Determine acceptable evidence  
*Analyze multiple sources of evidence, aligned with Stage 1*

**Stage 3:** Plan learning experiences and instruction  
*Derive the implied learning from Stages 1 & 2*

Standard(s):	
Understandings	Essential Questions
Stage 1 <b>What are the big ideas?</b>	
Assessment Evidence	
Stage 2 <b>What's the evidence?</b>	
Learning Activities	
Stage 3 <b>How will we get there?</b>	

# TRANSDISCIPLINARY UNIT PLAN

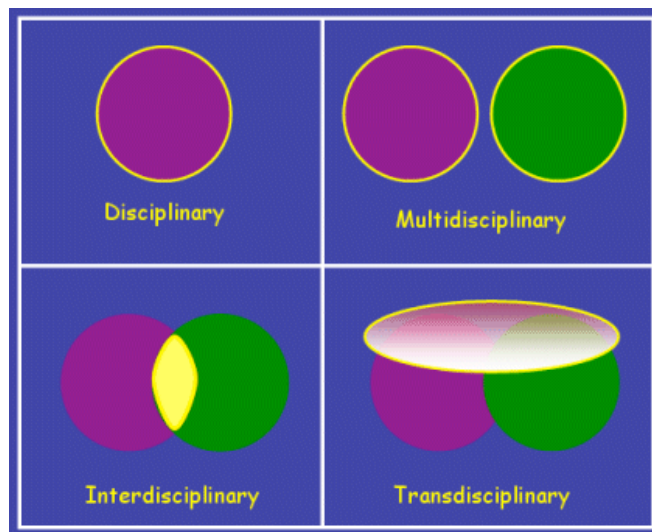
Stage 1: Desired Results	Designer(s)/Teachers: B. Riccio, D. Garofalo, N. Schwartz, S. Rogers		
	Unit Plan Title:	Survival	Grade/Level: 1 <sup>st</sup>
	Subject/Discipline Areas:	Science, Social Studies, Math, Language Arts, Media	
	Time Required:	4 to 6 weeks	
	LMC Use Dates and other	TBD	
	Content Standards		
	Science 1.2, Zoology; Social Studies 1.10 Economics; Math 1.2 Measurement; Language Arts 3.1, 3.2 Communicating with Others, 4.1, 4.2, 4.3, Applying English Language Conventions, 1.1, 1.2, 1.3, Reading and Responding; Media, Research and Information Fluency, Communication and Innovation, Independent Learning and Literary Appreciation		
	Enduring Understanding:		
	All living things have needs.		
	Over-arching Essential Question (Transdisciplinary):		
Stage 2: Determine Acceptable Evidence	What do we all need to thrive in our community?		
	Essential questions		
	Science: What is a living thing? What do living things need? How do living things get what they need?		
	Social Studies: How can learning the differences between wants and needs help me survive?		
	Math: How does learning about measurement help me understand living things?		
	Language Arts: How can learning about non-fiction help us explain the world around us?		
	Media: How can the research process help me find the information I need?		
	Knowledge and Skills:		
	Students will know . . . Key terms: habitat, survival, mammal, bird, fish, needs, wants; The difference between wants and needs; Characteristics of living things.		Students will be able to . . . Design and produce a habitat; Describe what all living things need; Use nonfiction resources for research purposes; Collect data and document their observations of living things.
	Determine acceptable evidence of understanding (Student learning goals)		
Performance Task & Rubrics (e.g. Goal, Role, Audience, Scenario/Situation, Product/Performance and Standard/Criteria: G.R.A.S.P.S., Role, Audience, Format and Task: R.A.F.T.)			
<ul style="list-style-type: none"><li>Students are members of a research team for the Museum of Natural History.</li><li>Their job is to create a habitat for their assigned living thing.</li><li>Each team is assigned a different type of living thing from the following topics: mammal; bird; fish.</li><li>Each habitat must include everything their living thing needs to survive and thrive.</li><li>Each team will create a display of their habitat and present it to an audience.</li><li>All essential details must be represented and be correctly labeled.</li><li>Completed display habitats should include the following elements: air, food, shelter, sunlight, and water.</li><li>Evaluation will be based on teacher/student created rubric. (Sample rubric follows.)</li></ul>			
	5 Exceeds Standard	3 Meets Standard	1 Below Standard
Labels	All elements are correctly labeled and include at least 3 additional sources for at least 3 essential elements.	All elements are included and correctly labeled.	All essential elements are not labeled and are rarely accurate.
Content	Characteristics of living things and elements are accurately portrayed and supporting details are included for at least 3 additional sources.	Characteristics of living things and elements are accurately portrayed.	Characteristics of living things and elements are not accurately portrayed.
Presentation	Presentation is exceptionally clear, includes only accurate information and is completed independently.	Presentation is generally clear, accurate and requires minimal assistance.	Presentation is unclear, contains significant errors and requires considerable assistance.

## EXAMPLE OF UNIT PLAN BASED ON UbD FRAMEWORK



# Essential Questions and Transdisciplinary Learning

- Essential questions frame the unit by provoking genuine inquiry and deep thought.
- In developing units, much time is spent on developing a “burning” question that was worthy of inquiry or investigation.



# Transdisciplinary project planning process

- **TASK:** Divide into 4 groups. Your team will develop an outline for an interdisciplinary project which will last 2-4 weeks and can be implemented this year.
- Your team will report their results to the group at the conclusion of this planning time.



# Transdisciplinary project planning process

- 1) What are you planning to teach this semester?  
Imagine you had an 8-week planner to give a brief overview of what you plan to cover by unit.
- 2) Identify a common theme, idea, or concept that reflects your curriculum and will be the basis for the project.





# Transdisciplinary project planning process

- 3) Identify the Common Core Standards and Benchmarks that will be addressed.
- 4) Decide what the final project will be. (Backward Design)
- 5) Develop timeline for the project. (start and end date)



# Transdisciplinary project planning process

- 6) How will each teacher prepare students for the project? Identify tasks for each team member and establish responsibilities.
- 7) How can your colleagues support this project?





# Transdisciplinary project planning process

- 8) Brainstorm a motivational activity for the beginning and the conclusion of your unit. What's your hook and culminating event?
- 9) Choose a reporter to share your results with the group.



## 8 Week Plan

Name \_\_\_\_\_ Grade(s)/Level(s) \_\_\_\_\_

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	



## What Are Essential Questions?

- Are arguable - and important to argue about.
- Are at the heart of the subject.
- recur - and *should* recur - in life and throughout the K-12 classrooms.
- raise **more** questions – provoking and sustaining engaged inquiry.
- often raise important conceptual or philosophical issues.
- can provide organizing purpose for meaningful & connected learning - are interdisciplinary.

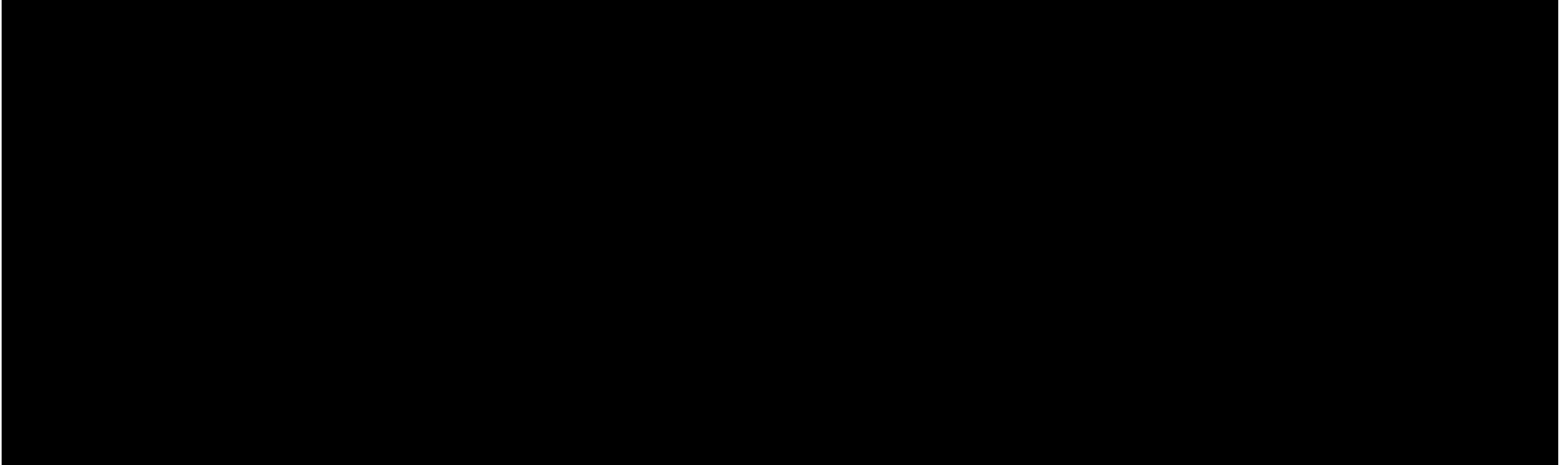


## Examples of Essential Questions:

- What is friendship? Who are your true friends?
- What is the relationship between popularity and greatness in literature?
- Why did (do) people come to the United States?
- What is the American Dream (is it fact or fiction)?
- How has technology changed society?



**You've got to go  
below the surface...**



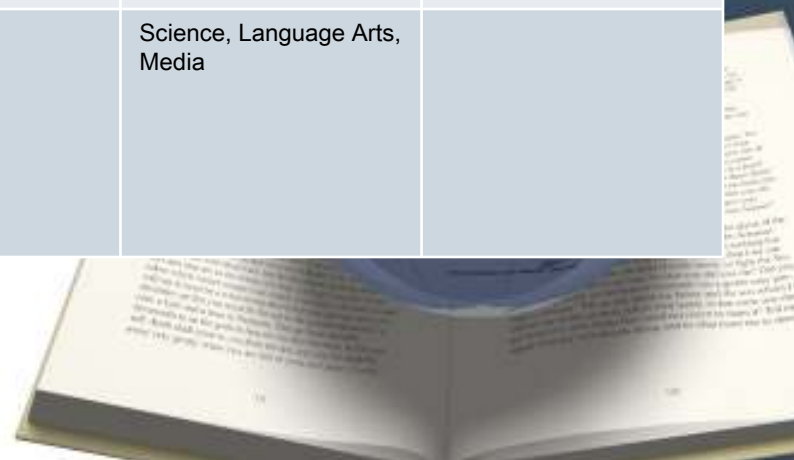
A photograph of an iceberg floating in the ocean. The visible tip of the iceberg is small and jagged, while the much larger, submerged portion is visible below the water line. The water is a deep blue, and the sky is a lighter blue with some clouds. The text is overlaid on the submerged part of the iceberg.

**to uncover the  
really 'big ideas.'**

# Transdisciplinary Units

## Grades K-2

Grade	Unit	Enduring Understanding	Essential Question(s)	Subject Area(s)	Performance Task
K	Weather Matters	Change in our environment affect us.	How can observing patterns help us predict and understand? How can understanding changes in the weather help us to survive?	Science, Math, Language Arts/Poetry, Social Studies , Media	Weather report for season of student's choice, expressing what the weather is like at that time and making a connection to their own life.
1	Survival	All living things have needs.	What do we all need to thrive in our community?	Science, Social Studies, Math, Language Arts, Media	Students create a habitat for an assigned living thing as members of a research team for the Museum of Natural History.
2	Botany			Science, Language Arts, Media	

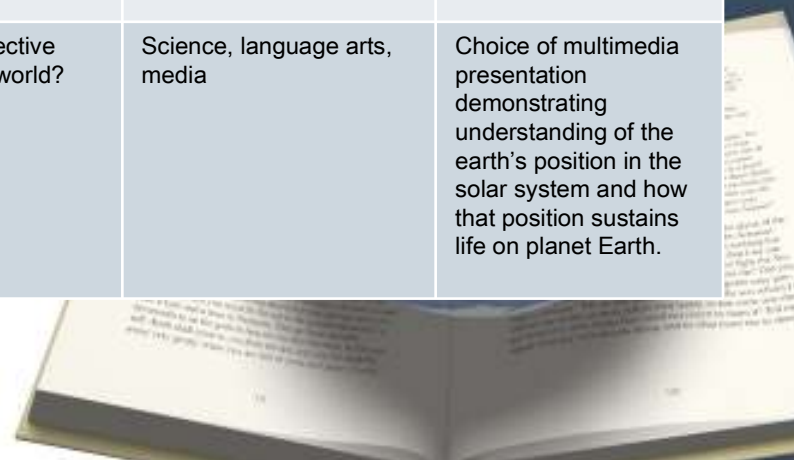




# Transdisciplinary Units

## Grades 3-5

Grade	Unit	Enduring Understanding	Essential Question	Subject Area(s)	Performance Task
3	Change is Part of our World	Change has positive and negative affects. Everything changes.	Why adapt?  How do we determine the impact of change?  How do we evaluate the impact of change?  Is all change good?	science, social studies, language arts, media and art.	Webquest  Presentation – Biome Research and Zoo Exhibit
4	Social Responsibility	How are we interconnected?	Healthy oceans are necessary for a healthy planet including all its populations.	Science, language arts, media	Letters in Advocacy of a Solution (ex: pollution in L.I. Sound, negative impact of humans on ecosystems)  Public Service Announcement
5	Perspective	The position of the Earth in the Solar System affects the conditions of life on our planet	How does your perspective alter your view of the world?	Science, language arts, media	Choice of multimedia presentation demonstrating understanding of the earth's position in the solar system and how that position sustains life on planet Earth.



# IMPORTANT TO NOTE FROM THE PLAN

- The Transdisciplinary Unit aligns with science, media, language arts – reading and writing – as well as the Arts. This is NOT an additional UNIT but replaces one of the three science units for the grade-level.
- Units are intentionally aligned with Reading/Writing non-fiction units and include digital texts.
- Resources, foundational lessons, assessments – and in some cases, Smartboard files are available to support teachers.



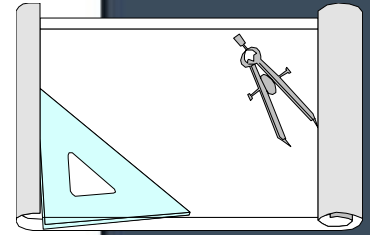
# What research tells us

Middle school programs that adhered to block time and core programs had:

- *no loss of learning of subject matter*
- students did as well or better than students in separate-subject programs.

(Vars)





**1. Identify desired results**

**2. Determine acceptable evidence**

**3. Plan learning experiences  
& instruction**



# Stage 1 – Identify desired results.

•Key: Focus on Big ideas

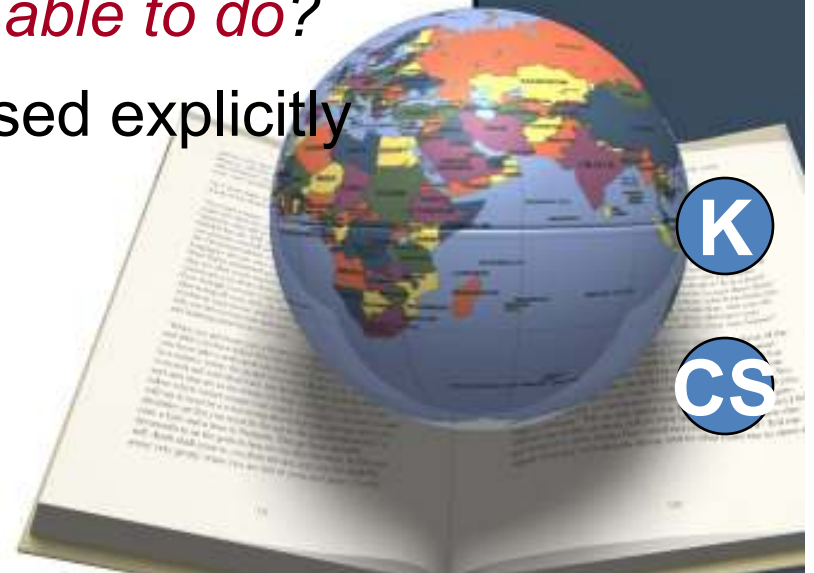
- *Enduring Understandings*: What specific insights about big ideas do we want students to leave with?
- What *essential questions* will frame the teaching and learning, pointing toward key issues and ideas, and suggest meaningful and provocative inquiry into content?
- What should students *know and be able to do*?
- What *content standards* are addressed explicitly by the unit?

U

Q

K

CS



# Knowledge vs. Understanding

- An **understanding** is an *unobvious and important inference*, needing “**uncoverage**” in the unit; **knowledge** is a set of established “facts”.
- **Understandings** make sense of facts, skills, and ideas: they tell us what our **knowledge** means; they ‘connect the dots’
- Any **understandings** are inherently fallible “theories”; **knowledge** consists of the accepted “facts” upon which a “theory” is based and the “facts” which a “theory” yields.





# Essential vs. “knowledge”

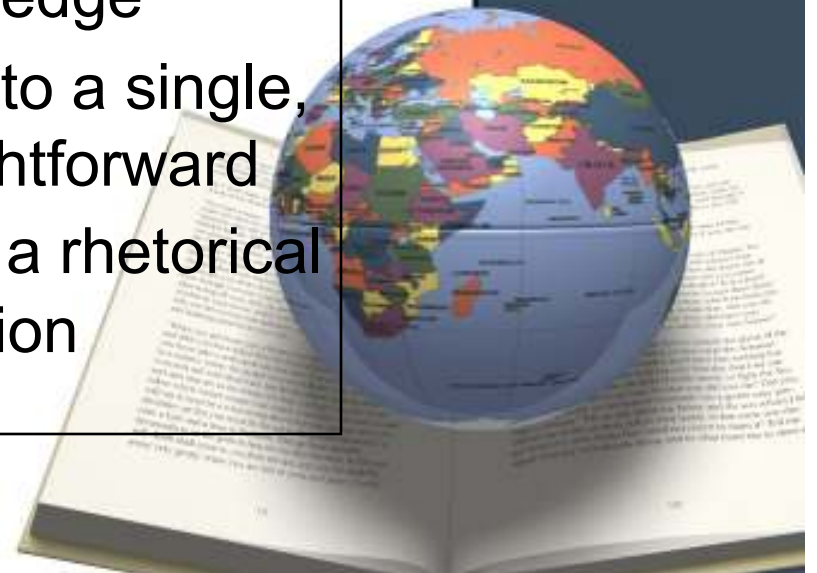
## Q’s used in teaching

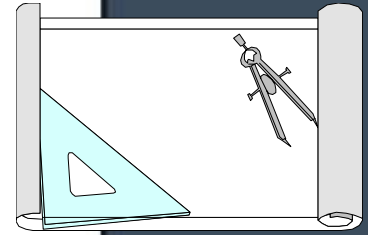
### Essential - STAGE 1

- Asked to be argued
- Designed to “uncover” new ideas, views, lines of argument
- Set up inquiry, heading to new understandings

### •Knowledge - STAGE 3

- Asked as a reminder, to prompt recall
- Designed to “cover” knowledge
- Point to a single, straightforward fact - a rhetorical question





1. Identify desired results

2. Determine acceptable evidence

3. Plan learning experiences  
& instruction



## Stage 2 – Assessment Evidence

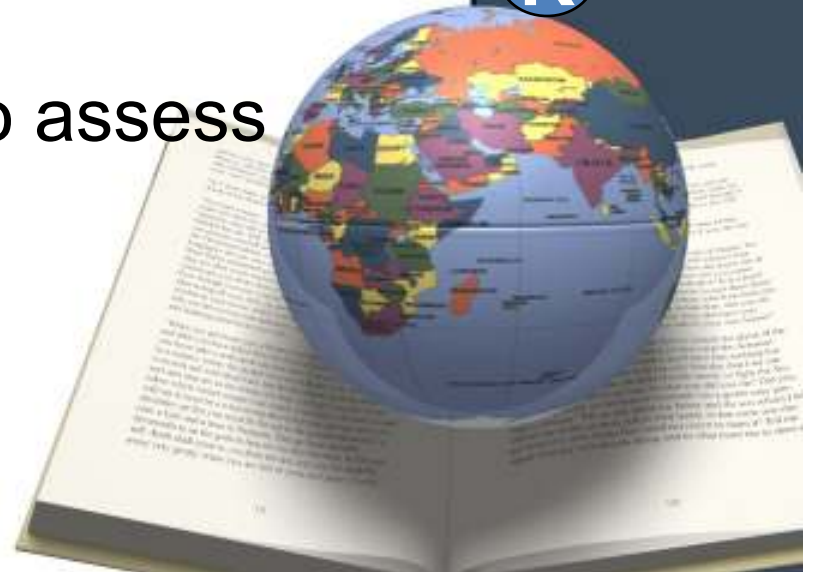
- Template fields ask:

- What are key complex performance tasks indicative of understanding?
- What *other evidence* will be collected to build the case for understanding, knowledge, and skill?
- What rubrics will be used to assess complex performance?

T

OE

R



# The big idea for Stage 2

- The evidence should be credible & helpful.
- Implications: the assessments should –*
  - Be grounded in real-world applications, *supplemented as needed* by more traditional school evidence
  - Provide useful feedback to the learner
  - Be valid, reliable - aligned with the desired results of Stage 1 (and fair)



# Assessment types

Traditional  
quizzes& tests

- paper/pencil
- selected-response
- constructed response

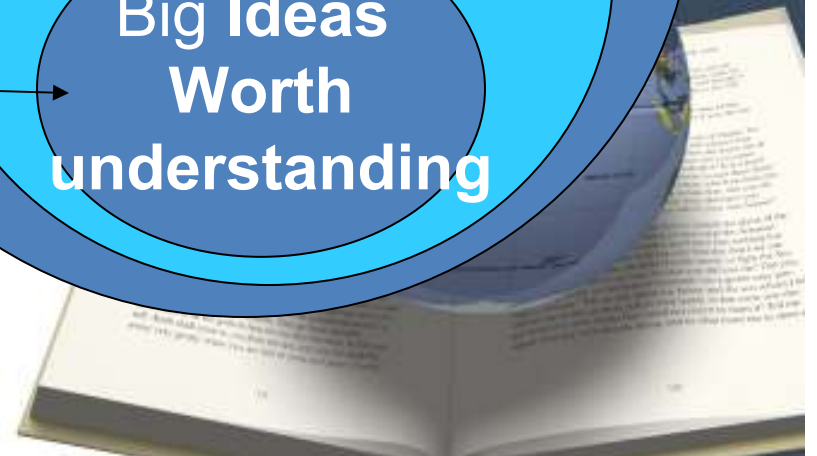
Performance tasks  
& projects

- open-ended
- complex
- authentic

Worth being  
Familiar with

Important to  
know& do

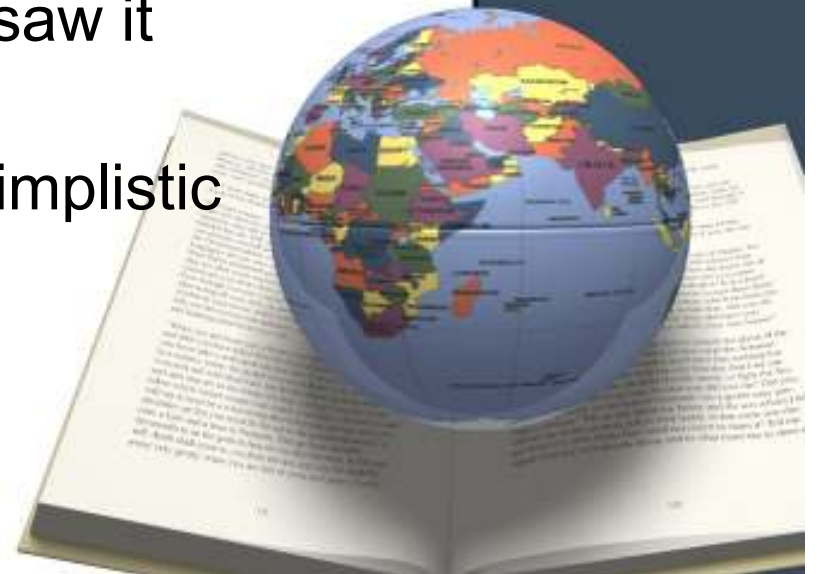
Big Ideas  
Worth  
understanding



# Assessment of Understanding via the 6 facets

•i.e. You really understand when you can:

- explain, connect, systematize, predict it
- show its meaning, importance
- apply or adapt it to novel situations
- see it as one plausible perspective among others, question its assumptions
- see it as its author/speaker saw it
- avoid and point out common misconceptions, biases, or simplistic views



# Scenarios for Authentic Tasks

- Build assessments anchored in authentic tasks using GRASPS:

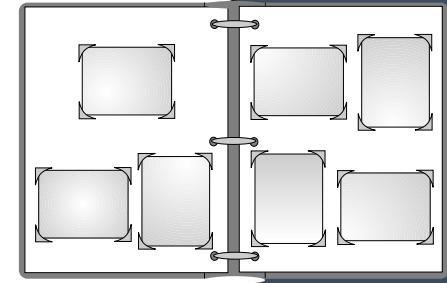
- G** – What is the **G**oal in the scenario?
- R** – What is the **R**ole?
- A** – Who is the **A**udience?
- S** – What is your **S**ituation (context)?
- P** – What is the **P**erformance challenge?
- S** – By what **S**tandards will work be judged in the scenario?

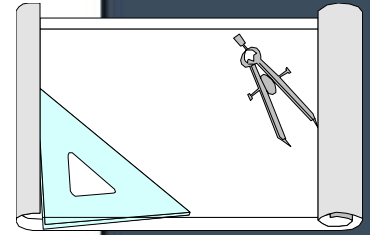




## Reliability: Snapshot vs. Photo Album

- We need patterns that overcome inherent measurement error
  - Sound assessment (particularly of Common Core Standards) requires multiple evidence over time - a photo album vs. a single snapshot





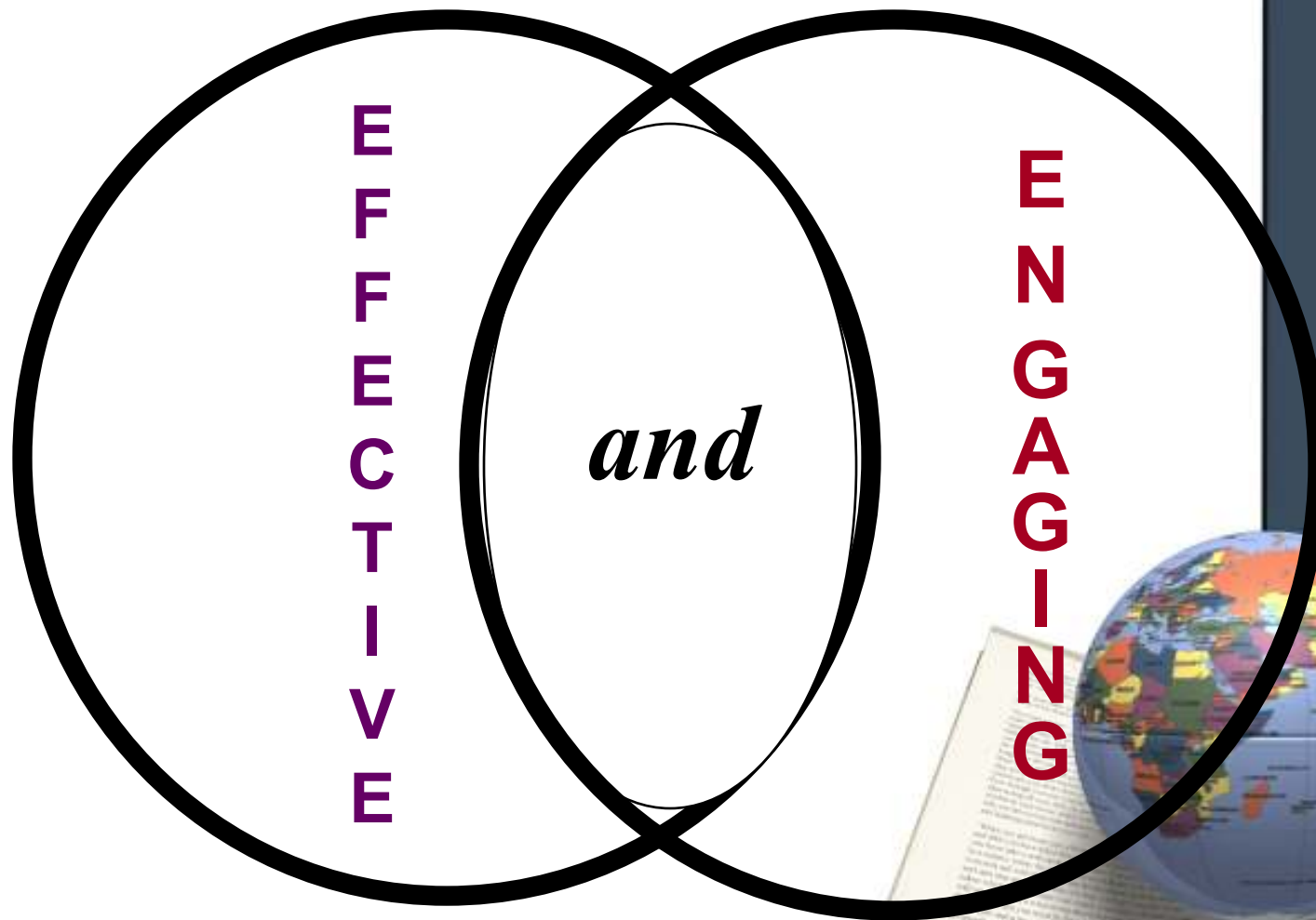
**1. Identify desired results**

**2. Determine acceptable evidence**

**3. Plan learning experiences  
& instruction**

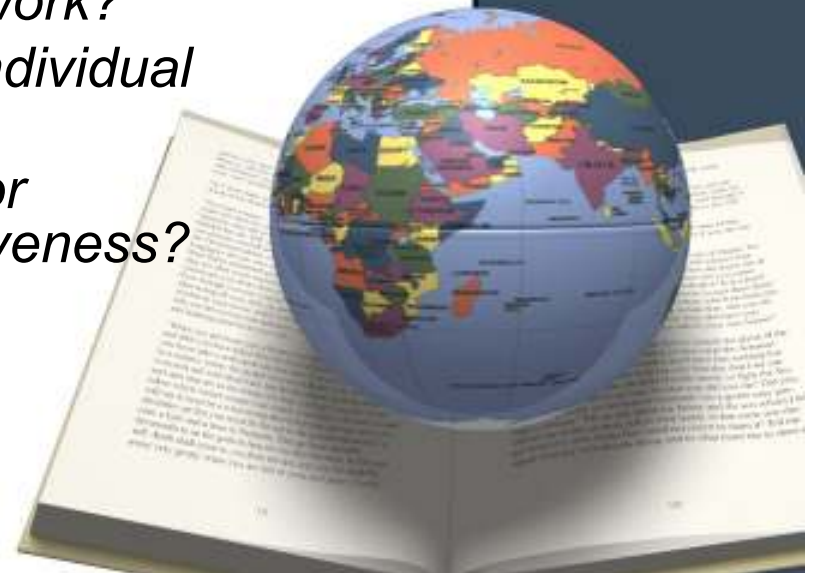


# Stage 3 big idea:



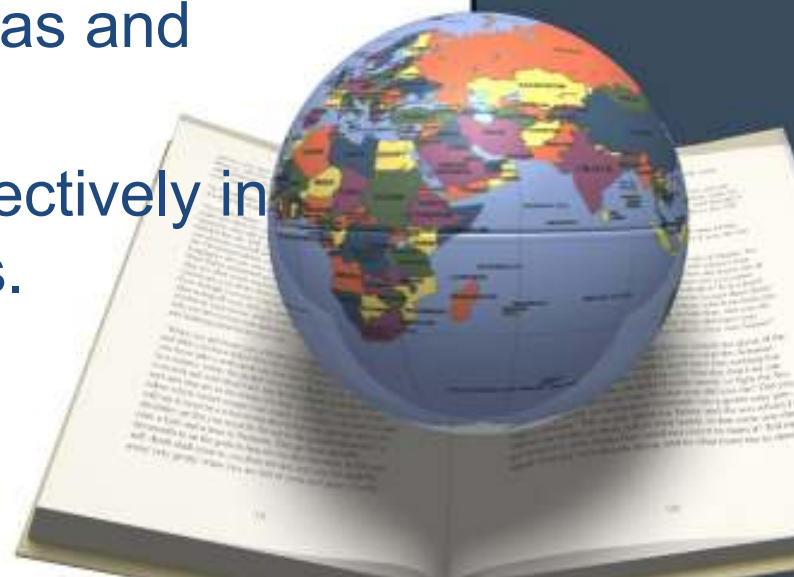
# Think of your obligations via W. H. E. R. E. T. O.

- W** • “*Where* are we headed?” and *why*? (from the student’s perspective)
- H** • How will the student be ‘*hooked*’?
- E** • What opportunities will there be to be *equipped*, and to *experience* and *explore* key ideas?
- R** • What will provide opportunities to *rethink*, rehearse, refine and revise?
- E** • How will students *evaluate* their work?
- T** • How will the work be *tailored* to individual needs, interests, styles?
- O** • How will the work be *organized* for maximal engagement and effectiveness?



## Observable Indicators of UbD: A-M-T

- What should be going on in the classroom?
- Acquisition—acquire factual information and basic skills.
- Making meaning—come to an understanding of important ideas and processes.
- Transfer—transfer learning effectively in new and challenging situations.



# What research tells us. . .



# Integrated Curriculum research

- Students taught with integrated curriculum reported that they specifically liked working in teams and indicated improvements in both attitude and work habits.

Source: MacIver(1990)





# Integrated Curriculum research

- Teacher attitudes improve.
- Teachers who integrate curriculum find that they can teach more in greater depth with students more actively involved in the learning process.

Source: (Edgerton, 1990), (MacIver, 1990), and (Greene, 1991).



## Studies also find that. . .

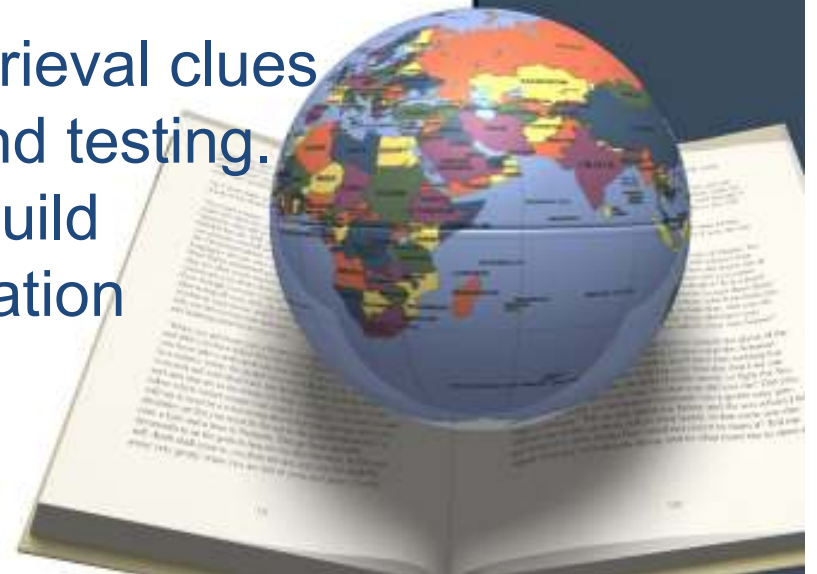
- Integrated curriculum helps students apply skills.
- An integrated knowledge base leads to faster retrieval of information.
- Multiple perspectives lead to a more integrated knowledge base.
- Integrated curriculum encourages depth and breadth in learning.
- Integrated curriculum promotes positive attitudes in students.
- Integrated curriculum provides for more quality time for curriculum exploration.

(Lipson, 1993)



# Student-centered learning with real-world connections

- Prior knowledge is the basis for new learning. Hooking new information into prior knowledge forms meaningful connections.
- Retrieval is cue dependent. Retrieval clues are crucial during diagnosing and testing. Thus, it becomes important to build multiple pathways to the information instead of just memorizing it.



# Successful integration requires that teachers:

- Accommodate academic performance standards.
- Incorporate industry-specific skill standards
- Establish ground rules and identify responsibilities

Source: Career Academy Toolkit, Mittlesteadt, Reeves

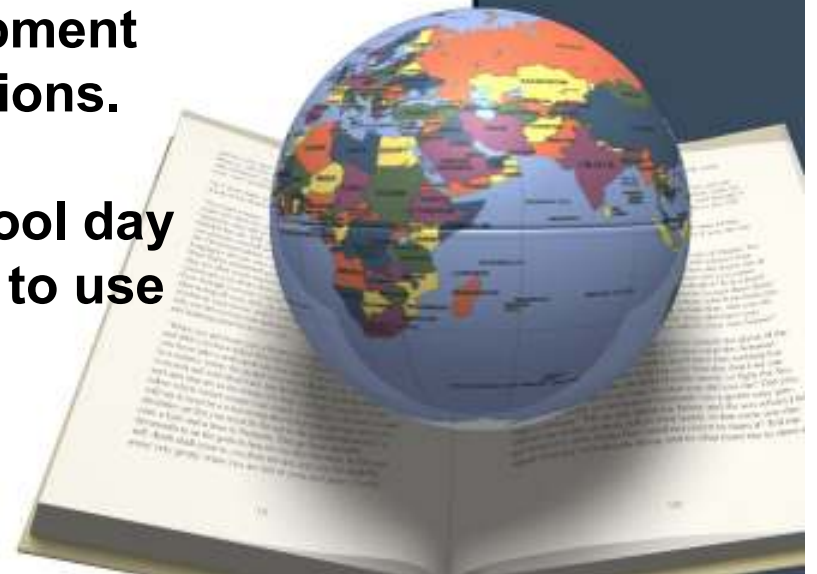


What the greatest challenge you can foresee to interdisciplinary planning?



# Examples for making time:

- **Schedule planning time and lunch together – extending the time teachers have together to plan.**
- **Reschedule day-long staff development meetings to shorter teacher team planning meetings. Ex: refigure 5 staff development days into 13 two –hour planning sessions.**
- **Banking time – lengthening the school day and releasing the students on certain to use the ‘banked’ time for planning.**



# Think – Pair - Share

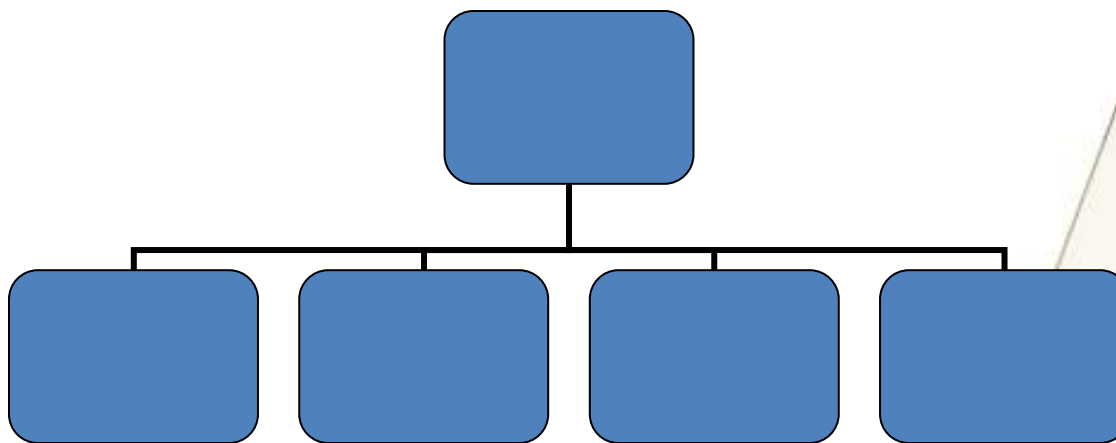
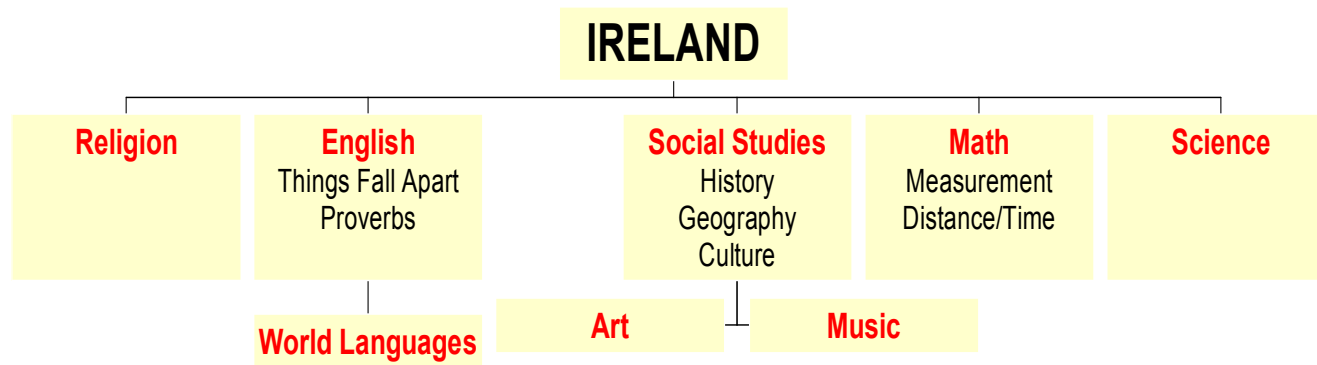
**Give two suggestions when your team can plan beyond common planning time.**





# Two approaches

What we've done. . .



# We'll try it!





# DISCUSSION

- How can this learning approach connect into my current classroom practice?

